

# Counterfeit Parts Detection

## Dealing with the Risk of Counterfeit Parts in your Supply Chain

Counterfeit parts are marketed with the intent to deceive. Customers are led to purchase substandard or defective products while under the assumption that they have purchased high-quality parts from reputable manufacturers.

This “intent to deceive” defines a counterfeit part and separates it from a faulty part which has defects that are unknown to the manufacturer or the distributor.



**Despite best efforts,  
assembled products  
may still contain  
counterfeit parts.  
NASA is exploring  
ways to expose them.**

Johnson Space Center

Counterfeit parts and materials that are unknowingly used in the aerospace and defense industries adversely affect the global supply chain because these same parts are also supporting consumer industries such as cell phones, computers, commercial airlines, and auto manufacturers. **The resulting impact includes:**

#### For industry:

- Costs to mitigate this risk
- Costs to replace failed parts
- Loss of sales
- Loss of brand value or damage to business image

#### For government:

- Risk for safety and National Security
- Costs to detect counterfeit parts
- Lost tax revenue due to illegal sales of counterfeit parts

**Screening of parts, components and materials include the following analysis capabilities:**

#### X-ray Fluorescence Spectroscopy

An efficient toll to determine the percent composition of solder used on boards, plating thickness, and qualitative chemical analysis of elements during investigations.

#### Optical Emission Spectroscopy

A tool to verify the chemical composition of metals. This can be critical in ensuring the correct alloy is being implemented in the design application for which it is intended.

#### Destructive Physical Analysis (DPA)

A systematic approach to disassemble a component, electronics board, or part to solve unique problems ranging from contamination issues to metallurgical questions. The result may enhance complex failure analysis.

#### Scanning Electron Microscope (SEM)

Non-destructive tool used in failure analyses to examine samples at extremely high magnifications, high resolutions, and with greater depth of field.

#### Real-time Radiography

Non-destructive examination of components, assemblies, or materials for internal problems that would otherwise go undetected and could lead to failure.

## Case Study:

#### BACKGROUND:

Because of the high rate of failure during full functional electrical testing of SEAWARS (Seawater Activated Release System) devices, the customer submitted 11 SEAWARS devices to RITF for evaluation.

#### INVESTIGATION:

Internal examination of the SEAWARS devices revealed that 4 out of 11 had counterfeit Analog Devices, Inc (ADI) Voltage Reference devices (P/N AD 580TH).

#### External examination of counterfeit AD 580TH devices revealed:

1. The top cover was sanded off.
2. AD logo was etched onto the top cover



Authentic



Counterfeit

#### Internal examination of counterfeit and good ADI devices revealed:

1. Linear Technology (LT) logo instead of ADI logo.
2. P/N 10198 instead of C580.
3. Square die instead of rectangle die



Authentic



Counterfeit



For the benefit of all

**For more information:**

[www.nasa.gov/centers/johnson/ritf](http://www.nasa.gov/centers/johnson/ritf)

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